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in the form of lessons on the use of astronomical and physical instruments, and the proper manipulation of the microscope, and lectures on these and other subjects will be given during the next winter.

In the basement of the building are the laboratories, and the machinery used for the various purposes of the institution, as will be seen on consulting the plan. Among the more important mechanical devices we may call especial attention to the gas-engine, which drives a dynamo for charging the storage batteries, and a force-pump for replenishing the hydraulic reservoirs; and to the machinery connected with the hydraulic apparatus for raising the floor and turning the dome of the large telescope. From here also starts the maze of water and gas pipes, electric cables and telephone wires which is spread throughout the building above.

We have found, with satisfaction, that the advantages offered by the various departments of Urania outlined above have been recognized by all classes of society. Over 60,000 persons visited the institution during the first half year of its existence, as has been said. Among these were a great number of students, in whose favor a reduction of half the regular price was made, and many teachers of the city schools, who are admitted free. School children under the care of their teachers have also been admitted, since the middle of November, three times a week, during the forenoon, and special entertainments are given every Sunday morning to workingmen at an entrance price of only twenty pfenninge (five cents). Various societies and corporations have secured the privilege of exclusive attendance during the afternoon hours on Sundays, and the doors are then not opened to the general public until three o'clock. The permanency of our institution is assured beyond doubt by this great and increasing popularity, and the satisfaction in its management that we are assured is felt by all becomes in the highest degree our own.

Since the foregoing article was put in type, the Report of *Gesellschaft Urania* for the past year has been received. From this interesting paper the following notes are taken: Since the opening of the institution to the public, visitors have been admitted on 268 days, and no less than 95,000 persons have availed themselves of the privilege. Among these must be counted 5,600 students, 7,900 members of various societies, 5,600 members of workingmen's societies, and 11,100 pupils from the city schools. The greatest number of visitors on any one day was 1,310. Three hundred and thirteen lectures of about ninety minutes long, and five hundred and eighty-two lectures of thirty minutes in length, have been given.

The receipts for the 268 days in question have been over $26,000 (or about

$98 per day). The greatest receipt for a single day has been $221. The expenses for a whole year have been:

For salaries, etc.	(about)	$13,380
" supplies, etc.	"	6,549
" advertisements, etc.	"	2,372
In all	(about)	$22,301

The journal, *Himmel und Erde*, has at present 1,500 paying subscribers, and has cost some $3,800 more than the receipts from subscribers. It has rendered most valuable service to science, not only by its important articles, but also by its capital reproductions of astronomical and other drawings and photographs. In this direction it has already conquered an absolutely unique position.

The foregoing statistics speak eloquently of the immense usefulness of this popular astronomical institute in its very varied relations, and the splendid success of its first year's work is a promise for its continued prosperity in the future. The benefits which such an establishment confers are manifold and far-reaching —from instruction to thousands of pupils in the schools up to opportunities of research in many branches afforded to skilled scientists. It is to be hoped that the brilliant success of *Gesellschaft Urania* may lead to the establishment of similar institutions in the different countries of Europe and of America. Fixed observatories already established can do no more useful work than by co-operating with such popular institutions in the fullest manner. E. S. H.

ASTRONOMICAL PHOTOGRAPHY AT THE LICK OBSERVATORY.*

By Edward S. Holden.

The editors of the *International Annual* have kindly asked me for an account of our photographic work at the Lick Observatory, and although (for reasons not necessary to state here) our work of this kind has but just begun, I am very glad to comply with their request, and to give very briefly our experience up to this time.

The experiments so far made indicate that the photographic lens (thirty-three inches aperture, 570 inches focus) will be found as satisfactory as the visual objective, thirty-six inches aperture, 694 inches focus. Both of these were made by Alvan Clark & Sons. The mounting of the great telescope is by Warner & Swasey of Cleveland, and this also has proved to be very satisfactory. The dome of seventy-five feet diameter (made by the Union Iron Works of San Francisco), with its elevating floor (sixty-one feet in diameter),

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